# T10D01 – Simple Organic Nomenclature

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| homologous series | functional group | prefix / suffix  (\* = usual use) | example | |
| alkenes |  | *suffix -***ene** |  |  |
| alcohols |  | *suffix\* -***ol**  *prefix* **hydroxy-** |  |  |
| haloalkanes |  | *prefix* **chloro-**  **bromo-**  **iodo-** |  |  |
| aldehydes |  | *suffix -***al** |  |  |
| ketones |  | *suffix\* -* **one**  *prefix* **oxo-** |  |  |
| carboxylic acids |  | *suffix -* **oic acid** |  |  |
| amines |  | *suffix\* -* **amine**  *prefix* **amino-** |  |  |
| esters |  | *suffix -***oate** |  |  |

* The name is based around the name of the longest carbon chain (which contains the functional group):

1 C = meth, 2C = eth, 3C = prop, 4C = but, 5C = pent, 6C = hex, 7C = hept, 8C = oct, etc.

* The functional is indicated by a prefix of suffix. *e.g. chloroethane*
* The position of the functional group is given by a number, counting from the end that gives the functional group the lowest number (for aldehydes, carboxylic acids & nitriles, the functional group is position 1). *e.g. butanal.*
* Where there are two or more of the same groups, *di*-, *tri*- or *tetra* are used.
* If there is more than one functional group, numbers are separated by commas and the groups are listed in alphabetical order (ignoring *di*, *tri*, etc.). *e.g. 3-bromo-1-chlorobutane, 2,2-dibromo-1-chlorobutane*.
* Where there are two functional groups, both with suffixes, the preference for the one to have the suffix is

carboxylic acid > aldehyde > ketone > alcohol. *e.g. 2-hydroxypropanoic acid, 2-aminopropanoic acid.*

* The suffix for alkenes can go in front of other suffixes, *e.g. 2-chlorobut-3-enal.*
* If a number is not necessary (i.e. the group could only be in one place) then no number should be given.
* Numbers are separated by commas and word and numbers by dashes, *e.g. 1-chloro-2,3-dimethylbutane*.

***Alkanes***

|  |  |  |  |
| --- | --- | --- | --- |
| CH3CH2CH(CH3)CH2CH3  3-methylpentane |  | CH3CH(CH3)CH(CH3)2 |  |
| CH3CH2CH(CH3)CH3 |  | (C2H5)2CHCH(CH3)CH(CH3)2 |  |

***Alkenes***

These have the ending **–ene**. If necessary the number of the position of the double bond added between the name stem and the -ene ending:

|  |  |  |  |
| --- | --- | --- | --- |
| CH3CH2CH=CH2  but-1-ene |  | (CH3)2C=CHCH3 |  |
| CH3CH=CHCH3 |  | (CH3)3CC(CH3)=CHCH3 |  |

***Haloalkanes***

Regard the halogen as a substituent on the C chain and use the suffix **-fluoro**, **-chloro**, **-bromo**, or **-iodo**, and give the position number if necessary:

|  |  |  |  |
| --- | --- | --- | --- |
| CH3CH2CH2CH2Cl  1-chlorobutane |  | CH3CHICH3 |  |
| CH3CH2Br |  | CH3CH2CH(CH3)CH2CHFCH­3 |  |

***Alcohols***

These have the ending **-ol** in place of the last -e, and if necessary the position number for the OH group is added between the name stem and the –ol (if there are two functional groups, it can begin with **hydroxy-**):

|  |  |  |  |
| --- | --- | --- | --- |
| CH3CH(OH)CH2CH3  butan-2-ol |  | CH3CH(CH3)CH(OH)CH3 |  |
| CH3CH2OH |  | CH3CH=CHCH2OH |  |

***Aldehydes***

These have the ending **-al** in place of the last -e, but no number is necessary for the aldehyde group as it must always be at the end of the chain:

|  |  |  |  |
| --- | --- | --- | --- |
| CH3CH(CH3)CH2CHO  3-methylbutanal |  | HCOCH(CH3)CH2C(CH3)3 |  |
| CH3CH2CHO |  | CH3CH(CH3)CH(C2H5)CH2CHO |  |

***Ketones***

These have the ending **-one** in place of the last -e, with a position number if necessary between the stem and the -one suffix. The functional group can go at the beginning if there is another functional group as **oxo-**.

|  |  |  |  |
| --- | --- | --- | --- |
| CH3CH2CH(CH3)COCH3  3-methylpentan-2-one |  | CH3COCH2CH2CH3 |  |
| CH3COCH2CH3 |  | CH3CH(CH3)COCH(CH3)2 |  |

***Carboxylic acids***

These have the ending **-oic acid** in place of the last -e, but no number is necessary for the acid group as it must always be at the end of the chain:

|  |  |  |  |
| --- | --- | --- | --- |
| CH3CH2CH(CH3)CH2COOH  3-methylpentanoic acic |  | CH3CH(C2H5)CH(CH3)COOH |  |

***Amines For the new programme (first exam 2009 and onward) you only need to identify the functional group.***

These end in **–amine**, but it can go at the beginning if there is another functional group as **amino-**.

|  |  |  |  |
| --- | --- | --- | --- |
| CH3CH2CH2NHCH3  methylbutylamine |  | (CH3)2NCH2CH3 |  |
| CH3CH2NH2 |  | CH3CH2COCH2NH2 |  |

Draw the structure of each of the following organic compounds.

|  |  |
| --- | --- |
| 1) 2-methylpentane  2) 2,3-dimethylhexane  3) pent-2-ene  4) 3-methylbut-1-ene  5) 1-chloro-2,2-dimethylbutane  6) 2-methylpropan-2-ol  7) butanal | 8) butanone  9) butanoic acid  10) 2,2-dimethylbutanoic acid  11) dipropylamine  12) propanenitrile  13) 3-hydroxybut-1-ene  14) 4-hydroxypentanal |

Name the following organic compounds.

|  |  |  |  |
| --- | --- | --- | --- |
| 15) |  | 23) |  |
| 16) | CH3CHBrC(CH3)2CH2CH2Cl | 24) | CH3COCH2CH(OH)CH3 |
| 17) |  | 25) | CH3CH2CH2CH2CHO |
| 18) | (CH3)2C=CH2 | 26) |  |
| 19) | (CH3)3CCH=CH2 | 27) | CH3CH(C­2H5)CH2CH2COOH |
| 20) |  | 28) |  |
| 21) | (CH3)2CHCHClCH(CH3)2 | 29) | CH3CH2NHCH3 |
| 22) |  | 30) |  |